Tetanus

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Inaugural Thesis.
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Thesis on Tetanus

Induced by observations, which I have made on tetanus, and the different modes of treating it, I have selected it as the disease, on which I shall make the following remarks, and conscious of their defects, cheerfully submit them to deeper, and more thorough investigation.

This disease may make its appearance in different climates and at different seasons of the year but it most frequently appears in hot weather and warm climates. The whole human race whatever their age sex or species are also liable to it and by some authors it has been mentioned as one of the opprobria medicorum. The cases which have come under my notice were confined to strong robust men or boys none of them over forty years of age. I do not wish to infer from this that the disease is more frequent among men than among women

but I think that it might be more satisfactorily accounted for by their being more frequently exposed to such accidents as are calculated to produce the disease. The causes of this disease are well know to be various, such as gun shot wounds, compound fractures, serious punctures and various other injuries done to the body, or it may be produced by exposure to cold after great excitement or fatigue causing a suppression of perspiration it is also said to be produced by irritating substances in the stomach and bowels, such as worms and it may likewise arise from surgical operations. The violence of this disease depends much upon its cause for if it arises from punctures serious or any injury done to the body it is more fatal, generally coming on about the eighth day, but in this there are many varieties for in some instances it does not appear for a much longer

time. But if the disease proceeds from exposure to cold it then comes on much sooner. This disease generally advances gradually but sometimes comes on suddenly to a most violent degree. When the approach is gradual the patient is first taken with a stiffness in the back of the neck which gradually increases and renders the motion of the head in any direction painful and difficult. As this stiffness of the neck increases there is an uneasy sensation at the root of the tongue with some difficulty of swallowing, a great tightness is perceived about the chest with pain at the lower end of the sternum shooting backwards towards the spine. The muscles on the back of the neck are now much affected with spasm and pull the head directly backwards, the muscles of the lower jaw also take on this spasmodic action and are violently affected. To this stage of the disease writers have

given the name of locked jaw or trismus and with some patients the spasmodic affection extends no farther. but when the disease advances the spasms become more general and affect the muscles of the whole spine so as to bend the trunk of the body backwards, which writers call opisthotonos. During the whole course of the disorder the abdominal muscles are violently affected with spasm, the belly is strongly retracted and feels very hard, the bowels are costive and both the flexor and extensor muscles of the lower extremities are simultaneously affected so as to keep the limbs rigidly extended. The flexors and extensors of the head and trunk at length become so much affected as mutually to balance each others action and to keep the head and trunk so rigidly extended and straight as to render it incapable of motion in any direction. The arms which had been but little affected before are now likewise rigidly extended, the tongue being also affected with spasm

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is sometimes convulsively darted out of the mouth and is much injured by the teeth and it is to this state of the disease that the term of tetanus has been strictly applied. The spasms recur now much more frequently than they did before the slightest cause being sufficient to bring them on, The face also becomes affected the forehead is corrugated the eyes are fixed in their sockets the countenance is much distorted and expresses great distress and notwithstanding the great abatement of the spasms which sometimes takes place in this disease they are apt to return with renovated force and unless relief is procured, the patient inevitably perishes. We seldom find any irregularity in the pulse except during the spasm, when it is small and irregular and the respiration is affected in the same way during spasm but when it subsides the pulse and respiration become quite regular and natural

The modes of treating this disease as recommended by different writers, are numerous and various, The practitioner first finds out the cause of the disease, and if it proceed from a wound or puncture, he carefully extracts any extraneous body that may have lodged therein, he then dilates the wound freely, and pours something stimulating into it, such as the Thebaic tincture, or spirits of turpentine. The different caustics, are also frequently applied to the wound, and afterwards it is covered with a soft poultice, to produce suppuration, and not unfrequently the wounded part is amputated, Opium, I believe has been more extensively used in this disease, than any other article of the Materia medica, and frequently with the best effects, the practitioner not taking into consideration, the quantity used, but the effect produced on the patient by its use, Some suppose, that joining it with camphor or

musk, increases its effect. The external application of it to the surface of the body is also recommended, by Thomas, as being useful in this disease. The warm bath has also been used, but Doctor Hillary in his writings, observes, that instantanious death has followed warm bathing in tetanus, and in Doctor Dorseys edition, of Coopers work on surgery, we see a similar account, of the effects of warm bathing, and from Cullen we learn, that the warm bath has done harm, and even occasioned death. Bleeding has been employed, but seldom with any evident benefit. Doctor Rush mentions that he found it useful, in one case, which came under his care in the year 1794. Mercury has often been used, but without any apparent benefit, and a late celebrated writer, tells us that he has never seen it of the least service,

in symptomatic tetanus. Tonics, particularly the Peruvian bark and wine, have been recommended by Doctor Rush, and in the New York Medical Repository for 1779, is mentioned a case of tetanus, arising from the puncture of a pin in the wrist, which was successfully treated by Doctor Hofnack, with wine alone. Cold bathing, has also been employed, and is highly recommended. Doctor Cullen says that it is a remedy, which in numerous trials, has been found to be of great service in this disease. Cooper in his work on surgery, recommends it, as one of the most effectual modes, of treating this disease. Doctor Thomas also tells us, that in all the instances of recovery from tetanus, which had taken place under his care, the cold bath had been used, and in combination with bark and wine, the cold bath appears to stand, decidedly preeminent, in the list of remedies, now

employed in tetanus, and as illustrative of their efficacy, I will relate the following cases.

In the latter end of july 1821, a man being employed in cutting some oats, for the purpose of feeding his horses, cut his finger, just across the middle of the second bone, and divided it entirely, except a small portion of the integuments, on the inside of it. The pendulous end of the finger was soon replaced, but an ill conditioned ulcer followed. Now as the remote and exciting causes of this disease, appear to act with more certainty, as well as violence where the degree of heat, excitement, and fatigue which the person might previously have undergone was great, this appears to have been a case well calculated for its production, the weather being warm and the patient much fatigued by the labours of the day

This wound did not unite by the first intention, but the bleeding from it was copious, and after a day or two, it put on a most unfavourable aspect, not suppurating, being entirely dry, and insensible to all the stimulating applications, which were used to rouse its sensibility. On the fifth day after the accident, in consequence of some fatigue which he underwent, he was taken with most of the symptoms of tetanus, as a stiffness of the neck, difficulty of swallowing, pain about the region of the stomach, an inclination to bend forward, spasms of the abdominal muscles, and thighs, pain shooting from the extremity of the sternum, backwards towards the spine, with tension and rigidity about the thorax, and, when asleep, his slumbers were interrupted by frequent starlings, accompanied with subsultus tendinum, Obstinate constipation also, of the bowels existed, which was removed

by gentle purgatives, and about the first of August the cold bath, bark and wine were freely used, with opium to mitigate the spasm. The cold water was poured upon the patient from some height in one gradual but continued stream. He was then, wiped dry, put to bed, and the bark and wine administered freely.

These means were repeated every two hours, and sometimes even more frequently, when the circumstances of the case demanded them; Nor was the free use of opium overlooked, in the severity of the spasms, it was invariably found to allay pain, and mitigate the sufferings of the patient; And though the attacks would return, the benefit resulting from this course of treatment, was evident, for their recurrence was attended both with a diminution of force and frequency, and would again and again be as promptly removed by the use of the same means. Finding however, that the disease did not appear

as if it would be entirely eradicated by this course of treatment, the finger was amputated, on the supposition that the disease would give way entirely to the above mode of treatment, after the exciting cause had been removed. The operation was performed just above the wounded part, and the stump put on a favourable appearance, suppurating kindly and soon healed. During the whole course of the healing process the disease continued, though in a milder form. In about a week after the operation, mercury was resorted to, with the hope of producing ptyalism. The mild muriate, was the preperation of mercury, first used, of which one grain was given three times per day. This mode of using it, however, was found inadequate to produce the desired effect, and it was, then, given in much larger quantities, but with the same result, neither did it act upon the bowels. The mild muriate was then,

exchanged for the unguentum mercuriale fortius, which was used in the way of friction upon the internal parts of the thighs, the groins, and also, in the axilla, till it produced such excoriation of the parts, to which it was applied, that a more extensive trial of it was thought inexpedient, and it was therefore, discontinued; and the corrosive muriate was substituted. This preparation was used extensively, but produced so great distress of the stomach, that it was abandoned as had been done with the other mercurial preparations. The time taken up in the employment of the mercurial medicine, was about three or four weeks, without their action ever being apparent on the salivary glands, but the disease appeared less violent as well as less frequent in its recurrence. Mercurial fumigations were next resorted to, but the result was the same as in the preceding attempts.

The mercurials were now entirely abandoned, as they could not be so exhibited, as to produce their desired effect, and had been productive of no apparent benefit. The cold water, bark and wine, and also the opium as the urgency of the case demanded it, were now used freely, as they appeared to be the only means, by which the disease could be subdued. It was accordingly persisted in for a week or ten days, with the happy effect of an almost entire removal of every unpleasant and morbid action. This plan of treatment, however, was continued for several days after an entire removal of ~~every~~ all the symptoms of the disease, so as to eradicate entirely the disposition to a recurrence. During these several days, he continued entirely free from all the symptoms of the disease, though somewhat costive from the quantity of opium, which he had used. The quantity of Peruvian bark employed in this case,

was nearly two pounds, with a proportionate quantity of wine, and the opium, when the spasms were severe, was frequently given two or three grains at a time repeated according to the urgency of the symptoms; The sulphuric ether was occasionally substituted for the opium, and apparently with some benefit, and the costive state of the body was easily removed; by the use of mild aperients, such as the sulphat of magnesia, or the sulphat of soda. His diet during this time, was light, and nutritive, and his appetite for food but little, if at all impaired; At this time after an entire absence of all the symptoms of the disease, for a week or ten days, being considered entirely well, the patient resumed his former occupations of labour, and was again taken with all the symptoms of tetanus, which distorted the features of the face in a most alarming

manner, and were not unfrequently so violent, as to cause him to be entirely frantic. The cold bath, in conjunction with the bark and wine, was immediately resorted to, and with the happiest effect. The first shower of the water dispelling most of the symptoms of the disease, and, where they continued after the patient was put to bed, the exhibition of an opiate would generally remove them, but this interval was of short duration, as the attacks would recur in a few hours, though each succeeding one was attended with much less violence than the one preceding it, and were as easily removed by resorting to the same means, as before, particularly the cold bath, followed up by the bark and wine. Other spirits were once or twice substituted for the wine, in consequence of the wine not being at hand, and they were sometimes used to such an extent,

as to produce intoxication. Though the benefit resulting from the spirits in this case, was inferior to that resulting from the use of the wine, it was certainly entitled to a considerable portion of credit. The patient however, being induced for some purpose to get out of bed, and walk across the room, was taken with violent spasms, particularly of the muscles of the head and neck, and the flexors and extensors were so much affected, as to render the head immoveable, in any direction, during their continuance. At the same time, his arms were rigidly extended, the buccinator and masseter muscles were also affected with violent spasms, and his jaws fast clinched. The cold water was instantly resorted to with the most astonishing benefit, for by its use the affection of the jaws as well as many of the other unpleasant symptoms, were dispersed, and the patients

condition, when compared with what it had been but a few moments before, was perfect tranquility. Nevertheless, the spasms, continued to recur for seven or eight days, but in every instance being treated with the cold affusions, in conjunction with the bark and wine, and occasionally an opiate, as the symptoms demanded it, were as easily removed as before, and gradually diminishing in force and frequency, they disappeared entirely in six or eight days, but left the patient in a very debilitated condition, with a distressing sensation about the stomach, accompanied with a sense of heat. This was thought to have been produced by the great quantity of stimulants, which he had taken in, and consequently the further use of the bark and wine, was not thought expedient. It was therefore discontinued, but the cold bathing was still practiced occasionally for ten or eleven days

longer. At the expiration of this time, he having been entirely free from every symptom of the disease, for more than a week, it was thought safe to dismiss him as cured, which was accordingly done. As before however resuming his former occupations of labour, the disease again made its appearance, in the course of a week or two, when he was taken with most of the symptoms, which denote the approach of tetanus. These gradually increasing, and being somewhat aggravated, from the exertion made by him to get to the house, soon became as violent as in any of the preceding attacks, The cold affusions, used as above mentioned, were resorted to the third time, and regularly followed up by the liberal use of the bark and wine, with the occasional use of an opiate, and although the opium always appeared to have great

power, in alleviating the sufferings of the patient, and mitigating the violence of the paroxysm, it can scarcely in this case, be entitled to as much credit, as might be given to the cold affusions, or to the bark and wine, for the benefit resulting from the employment of these two latter means, was in every instance evident, as the most violent symptoms would be entirely removed, or greatly alleviated by them. Doctor Wright of Jamaica gives an account of six cases successfully treated by affusions of cold water, Doctor Thomas Cochrane also gives an instance, in which the patient opened his jaws freely, and was enabled to walk upright in a day or two after affusions of cold water were employed, As advocates, for this plan of treatment in tetanus, several writers still

more celebrated than these last, have been mentioned before. In addition to what has been previously mentioned in favour of this mode of treatment, it was found in this third attack, to be equally as beneficial as in any of the foregoing. Finding, however, so great a disposition in the disease to reappear, upon the slightest occasions, after it appeared to be entirely removed; it was thought best to continue the same mode of treatment, though for a much longer time, than had been previously done, with a hope of eradicating the disposition, which appeared to lurk so obstinately in the system. Having been continued on till all the symptoms had disappeared, yet fearing that perhaps the treatment might not be found adequate to the extirpation of the disease,

it was exchanged for the mercurial plan, with a hope of establishing a mercurial action in the place of the tetanic one, which now existed. In this expectation, we were disappointed, for notwithstanding the extensive use of its various preparations, in many ways, it was found, as had been done on previous occasions, to make no apparent impression on the system. This being the case, its employment was given over, and we had now to trust solely to the cold affusions, bark and wine, for the entire elimination of the disease from the system. The employment of these remedies realized our most sanguine expectations, for the disease disappeared upon the use of them, in every instance, and we had every reason to believe, that by a continuance of them, if it was of sufficient

duration, the disease might be entirely removed. Having been so frequently foiled in previous attempts to accomplish this object, their use was regularly maintained for several weeks, after every symptom had entirely disappeared. In addition, a perfect state of rest and tranquility was strictly enjoined upon the patient, even for a much longer time. As the use of the bark and wine, reproduced the distressing sense of heat in the stomach, of which the patient had before complained, they were discontinued; and the cold affusions persevered in, for a much longer time. The patient was also prohibited from engageing in any pursuits, that might produce excitement or fatigue and in this condition of quietude, he was kept for a month or two, during which time, the disease entirely subsided. The patient was finally

dismissed as cured, and this obstinate and formidable disease was at last subdued, no return of the symptoms having been manifested since.

After the full and accurate account, which I have given of the above case, and its frequent relapses, so often removed by the same means, are we not authorized to consider the plan of treatment, as highly calculated to proove successful in this disease, at least in our climate. In confirmation of this opinion, I will relate a second case, which together with the first, will more satisfactorily demonstrate the propriety of the practice.

On the first of September, 1822, a strong athletic negro man, aged about six and twenty years, accidentally trod upon a sharp thorn, which penetrated between the metatarsal bones of the foot. The thorn was extracted soon

after the accident, but in a few days a most formidable attack of tetanus, made its appearance, commencing with almost universal spasm, with scarcely any or but few premonitory symptoms. The attacks being violent, and following in rapid succession, the sufferings of the patient became so great, that death appeared to be almost inevitable. In this critical condition, the shower bath was employed, and produced a more speedy and complete relief, from every spasmodic affection, than I had ever witnessed in any single instance of its employment. The first bucket full that was showered upon him, entirely dissipated every symptom of the disease, after which he was wiped perfectly dry, put to bed, and a large dose of bark and wine were exhibited. In this way the accession of the next paroxysm was much retarded,

the interval from one to the other, being greater than that, between any of the preceding paroxysms. In every succeeding paroxysm the employment of these means, was attended with the same happy result. The paroxysms still continued to return during the day, but gradually diminishing in force and frequency. On the following day, they entirely vanished, and left the patient in so debilitated a condition, that the cold affusions were suspended.

Notwithstanding this abrupt discontinuance of the treatment, the disease did not reappear, and the patient gradually recovering from his state of debility in a short time was restored to his usual health.

That the same success would attend this practice in warmer climates, as the East or West Indies I am unable a priori. I am however, inclined to believe that its employment

in those countries might prove useful.

On this subject, we find the testimony of authors to be at variance. Doctor Gordlestone of the East Indies informs us, that cold water, universally proved fatal in this disease. Doctor Rush, very satisfactorily accounts for this circumstance, from the debilitating effects of that warm climate, inducing such a state of the system, as renders it unable to react under the sedative effects of cold water.

May we not reasonably conclude then, that the cold water, if used with caution, so as not to reduce the system below the point of reaction, and gradually increasing it according to circumstances, would be as useful, in such a climate as our own;

This opinion I am inclined to adopt.

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Tetanus 1825

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